

Synthesizing Flight Software (FSW) Discrete Controllers from Formal Specifications

Completed Technology Project (2016 - 2017)



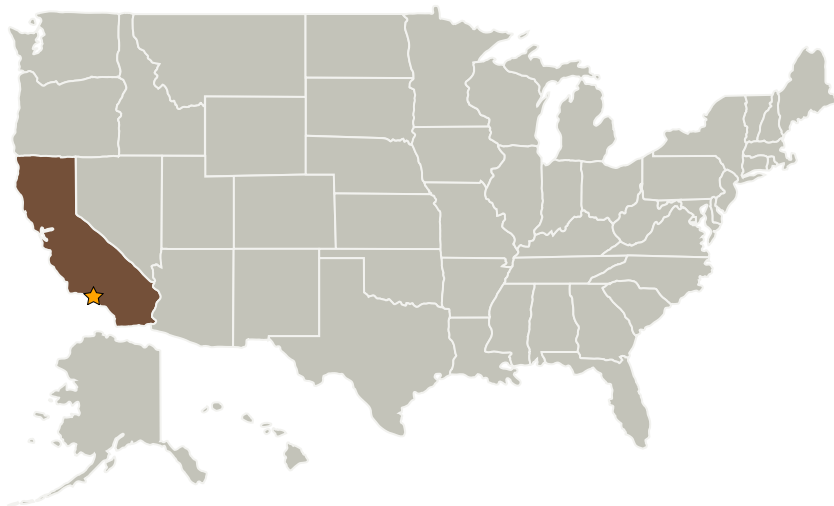
Project Introduction

This project will develop a Domain Specific Language (DSL) approach to interpret requirements and map them to formal specifications and legacy formats; explore and enhance the connection of TuLiP and SCA; develop methods to ensure semantics of the synthesized FSM designs map into implementations; and demonstrate the proof-of-concept synthesis on controller example cases. The key innovations will be: synthesis of FSM's that ensures a given formal specification is met (i.e., correct-by-construction). Also, complete software synthesis - no manually developed code>

Anticipated Benefits

To improve and optimize the use of combined control synthesis algorithms and code generation techniques to produce FSW directly from formal specifications.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California
California Institute of Technology (CalTech)	Supporting Organization	Academia	Pasadena, California



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Innovation Fund: JPL CIF

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Primary U.S. Work Locations

California

Project Management

Program Director:

Michael R Lapointe

Program Manager:

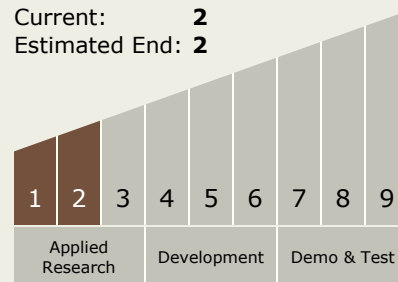
Fred Y Hadaegh

Principal Investigator:

Leonard J Reder

Technology Maturity (TRL)

Start: **1**
Current: **2**
Estimated End: **2**



Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
 - └ TX11.1 Software Development, Engineering, and Integrity
 - └ TX11.1.7 Frameworks, Languages, Tools, and Standards

Target Destination

Foundational Knowledge